## REMARKS

**Status of Claims:**

Claims 19-38 were previously pending and are presented for further examination.

New claims 39-54 are added. These claims are dependent claims that recite additional features, examples of which are illustrated in Figures 7 and 8 of the application. No new matter is added.

**Claim Rejections:**

Claims 19-21, 24-26, and 37 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana, Jr. et al. (U.S. Patent No. 6,680,832 B2) (hereinafter Fontana) in view of Ho et al. (U.S. Patent No. 6,754,056 B2) (hereinafter Ho).

Claims 22-23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana in view of Ho and further in view of Childress et al. (U.S. Patent App. Pub. No. 2003/0214763) (hereinafter Childress).

Claims 27-29, 32-36, and 38 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana in view of Takahashi et al. (U.S. Patent No. 6,870,718 B2) (hereinafter Takahashi).

Claims 30-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana in view of Takahashi and further in view of Childress.

The rejections are respectfully traversed.

Claims 19-21, 24-26 and 37

Regarding the rejection of claims 19-21, 24-26, and 37 over Fontana in view of Ho, the references together do not teach all features required by independent claim 19 or its dependent

claims, nor do they provide sufficient teaching to make obvious the claimed combination of features.

Fontana is admitted to lack teaching of a GMR spin valve stack that includes separated regions of patterned exchange layers. Ho is cited as teaching this feature, referring to insulating AFMs 320 and 322 of Figure 16. However, Ho's insulating AFMs are not included in the GMR spin valve stack as required by claim 19. Rather, they are located adjacent to the sidewalls of the GMR spin valve stack. Further, Ho's insulating AFMs are not patterned structures as required by claim 19. Ho's insulating AFMs are "backfilled" structures that fill vacant spaces left after ion milling that forms the GMR spin valve stack, and therefore have no pattern. *See* Ho Fig. 14-16 and col. 6, lines 39-45. Thus the combined teachings of Fontana and Ho lack features required by claim 19.

The references taken together also do not make obvious the structure required by claim 19. Fontana teaches the manufacture of a GMR spin valve stack over which are formed conformal oxide 14 and shield 16 layers. *See* Fontana Fig. 2. Ho teaches formation of insulating AFMs 320 and 322 around a GMR spin valve stack after the stack is formed, specifically by backfilling around the stack after it has been etched, so that the AFMs surround the stack at its sides. *See* Ho Fig. 14-16 and col. 6, lines 39-45. When taken together, these references present the conflicting and incompatible options of either forming a shield layer around the sides of the stack, as done by Fontana, or forming insulating AFMs around the sides of the stack, as done by Ho. The idea of including regions of patterned exchange bias material as part of the GMR spin stack, as required by claim 19, is not stated or implied by either reference. Thus the features of claim 19 and its dependent claims are not obvious in view of the combination of Fontana and Ho.

Claims 22 and 23

Claims 22 and 23 were rejected as obvious over Fontana in view of Ho and Childress. Childress does not teach the features or provide the teaching and suggestion missing from

Fontana and Ho, and so claims 22 and 23 are allowable for at least the reasons provided above for claim 19.

Claims 27-29, 32-36, and 38

Regarding the rejection of claims 27-29, 32-36, and 38 as being unpatentable over Fontana in view of Takahashi, the references together do not teach all features required by independent claims 27 and 38 or their dependent claims, nor do they provide sufficient teaching to make obvious the claimed combinations of features.

Fontana is cited as teaching a GMR spin valve stack and a pair of shields disposed on either side of the stack, with one including side shields that substantially enclose the stack, but is admitted to lack teaching of an insulated layer of permanent magnet material disposed between shields and abutting the free layer of the stack. Takahashi is cited as teaching this feature, referring to the domain control layers 501, 502, and 503 of Figure 5. However, Takahashi's layer of permanent magnet material (magnetic CoCrPt layer 502, *see* col. 7, lines 11-26) does not abut the free layer of the GMR stack represented by block 105. Rather, Takahashi's layer of permanent magnet material 502 abuts the continuous insulating layer 501 that is formed beneath the permanent magnet material 502 and against the sidewalls of the GRM stack 105. In fact, Takahashi specifically teaches against a structure in which the insulating layer 501 beneath the permanent magnet material 502 is not continuous up the sidewalls of the GRM stack. *See* col. 7, lines 21-26. Thus the combined teachings of Fontana and Takahashi lack features required by claims 27 and 38.

The references taken together also do not make obvious the structures required by claims 27 and 38. Fontana teaches the manufacture of a GMR spin valve stack over which are formed conformal oxide 14 and shield 16 layers. *See* Fontana Fig. 2. Takahashi teaches formation of domain control layers 501-503 around a GMR spin valve stack so as to extend up the entire height of the stack, leaving no room for any other material to surround or enclose the stack. *See* Takahashi Fig. 5. When taken together, these references present the conflicting and incompatible

options of either forming a shield layer that encloses the entire stack, as done by Fontana, or forming domain control layers that enclose the entire stack, as done by Takahashi. The references do not teach structures that enable the coexistence of both a shield layer that encloses the stack (claim 27) or the free layer of the stack (claim 38), and an insulated layer of permanent magnet material disposed between the shields and abutting the free layer. Thus the features of claims 27 and 38 and their dependent claims are not obvious in view of the combination of Fontana and Takahashi.

Claims 30 and 31

Claims 22 and 23 were rejected as obvious over Fontana in view of Takahashi and Childress. Childress does not teach the features or provide the teaching and suggestion missing from Fontana and Takahashi, and so claims 30 and 31 are allowable for at least the reasons provided above for claim 27.

New claims 39-54

Dependent claims 39-54 are allowable for at least the reasons discussed above with respect to their parent claims, and recite additional features not found in the cited references.

**Conclusion:**

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper

or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-0872.

Respectfully submitted,

Date October 11, 2006 By _____

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